

SURVEY ON THE LEVEL OF BLOOD LEAD AND OTHER HEAVY METAL ELEMENTS IN CHILDREN AROUND COPPER SMELTER AREA

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Background and Aims: To describe the impact of copper smelter on blood lead and other heavy metal elements concentrations of children living around.

Methods: Eighty children at the age of 6-11 from 4 schools which located within 5 km, between 5-10km, over 10km away from the copper smelter were chosen, respectively. The children's venous blood were collected by purple-cap tube and measured by ICP-MS to detect the levels of lead, zinc, iron, copper, selenium, nickel, mercury, cadmium, chromium and manganese. Arithmetic mean was used to describe the normal distribution measurements, geometric mean (GM) for those geometric normal distribution, and median for other distributions.

Results: The GM of blood lead was 28.53µg/L (15.28~53.83µg/L), much lower than reported Chinese children's average level of 76.71µg/L; the GM of blood copper was 926.67µg/L (729.07~1305.90µg/L), nearly equal to the level of 910µg/L of children 6-13 years old reported by Changli Zhang; and the mean of zinc with 5.23 mg/L (3.64~7.60 mg/L) was also nearly equal to Zhang's study. Meanwhile, the mean of selenium was 131.78µg/L, the GM of cadmium and manganese were 0.16µg/L and 17.19µg/L, the median of iron, nickel, mercury, and chromium were 69.98 mg/L, 2.38µg/L, 0.55µg/L and 1.73µg/L, respectively. The results of stratified analysis showed that (1) There was no dose-response relationship between the distance from the copper smelter and the concentrations of blood heavy metals; (2) The boys' blood levels of lead, iron and zinc were significantly higher than girls' ($P < 0.05$), while other heavy metals without gender difference; (3) There was no significant correlation between age of children and the levels of blood heavy metals.

Conclusion: The concentrations of heavy metal elements of children investigated were largely in the range of healthy children's blood heavy metal levels reported; there was no significant correlation between children's residences and their heavy metal levels.